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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/521,950

09/29/2005

Toshiaki Mizoguchi

52433/786

2220

26646

7590

08/12/2008

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EXAMINER

SHEVIN, MARK L

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

08/12/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/521,950	Applicant(s) MIZOGUCHI ET AL.	
	Examiner Mark L. Shevin	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05/02/2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 May 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status

1. Claims 1-9, filed May 2nd, 2008, are pending. Claims 1, 2, and 4-9 were amended.

Status of Previous Rejections

2. The previous rejections of claims 1-9 under 35 U.S.C. 112 second paragraph in the Office action dated November 27th, 2007 have been withdrawn in view of Applicants' amendments to claims 1-2 and 4-9 in deleting the term "fewer" and in changing "consisting mainly" to "consisting essentially".

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

3. **Claims 1-3, and 8-9** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ishiguro** (JP 52-070918) in view of **Nakato** (US 6,120,578).

Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product by process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process, *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966(Fed. Cir. 1985).

The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art,

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especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product, See e.g., *In re Garnero*, 412 F. 2d 276, 279, 162 USPQ 221, 223 (CCPA 1979).

Ishiguro:

Ishiguro, drawn to a method of manufacturing a cleaned steel accompanied by minimal non-metallic inclusions, teaches adding 0.001 - 0.05 wt% of one, two, or more types elements selected from Se, Sb, La, and Ce to a de-oxidized (killed) steel to minimize inclusions, especially alumina clusters. (claims 1 and 2).

Ishiguro does not teach the composition of the oxide-based inclusions.

Nakato

Nakato teaches a method of producing an alumina-cluster free (column 1, line 67) Al-killed (deoxygenated) steel product by adding Al and REM (rare earth metal, in particular Ce and La; column 2, lines 43-44) to a molten steel. The alumina concentration in the resultant oxide-based inclusion should be in the range of 30-85% (column 3, lines 28-30) and this allows one to include REM-oxides in the range of 0.5-15 mass% along with other minor oxides such as MgO and CaO (column 3, lines 50-55; and column 4, line 46).

The amount of REM-oxides is discussed as being important in controlling the shape of the oxide and subsequent formation of clusters (column 3, lines 12-15). Furthermore, the ratio of REM to Al should be controlled to regulate the oxides formed and allow for separation (column 3, lines 22-25). The

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deoxygenation method is applied towards a steel with an alloy composition with C, Mn, P, and S elements in the range of claim 4.

Nakato does not explicitly teach the composition of the clusters by individual oxide compound concentration (i.e. X% Alumina and Y% REM-oxide, only X% alumina).

Regarding claim 1, however, it would have been obvious to one of ordinary skill in the metallurgical arts at the time of the invention, taking the teachings of Ishiguro and Nakato as a whole, to produce the claimed amount of REM-oxide as Nakato suggests that the oxide-based inclusion (cluster) composition should be 30-85 wt% alumina("adjust the concentration", column 3, lines 27-31) and sets out guidelines for the composition indicating that it effects the final properties of the cluster and thus teaches the cluster composition and implicitly the REM-oxide amount (column 3, lines 12-15) as important in the formation of inclusions. Put another way, it would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed inclusion composition ranges through process optimization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

Regarding the amended features of claim 1, The transitional phrase "consisting essentially of" limits the scope of a claim to the specified materials or steps "and those that do not materially affect the basic and novel characteristic(s)" of the claimed invention (MPEP 2111.03, para 4). Ishiguro

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taught that the addition of rare earth elements such as La and Ce minimize the formation of inclusion clusters and Nakato taught that that the alumina concentration of the resultant inclusions should be advantageously adjusted to 30-85 wt%, thus leaving the remaining 70-15% for rare earth oxides and other non-critical oxides that may incidentally form such as CaO and MgO.

Furthermore, in changing “containing fewer alumina clusters” to “containing alumina clusters”, Ishiguro teaches that alumina clusters are minimized (claims 1 and 2).

Regarding claim 2, Nakato further suggests that the total oxygen level can be adjusted first by conventional agitation under vacuum methods to yield an oxygen level that can be subsequently changed by the composition of the deoxygenation alloy (column 3, lines 55-67). Nakato also teaches the relationship between REM concentration and oxygen activity in Fig 1.

Nakato does not explicitly teach a ratio of total REM to total oxygen (T.O.) that meets the claimed range of 0.05 – 0.5. However it would have been obvious to one of ordinary skill in the metallurgical arts at the time the invention was made, given the teachings of Ishiguro and Nakato as a whole to alter either the total REM content or total oxygen content as Nakato teaches the oxygen activities of the most active metal species including the REM, cerium, as a function of metal concentration (Fig 1) and one of ordinary skill would see that the oxygen content is a result effect variable that can be optimized as with the REM-oxide concentration.

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Regarding the amended feature of claim 2, the change from “consisting principally” to “consisting essentially” with respect to oxide-based inclusion composition was discussed at claim 1 above.

Regarding claim 3, example 3 of Nakato discloses a total REM content of 0.4 ppm and a total oxygen content of 18 ppm (column 4, lines 48-65). The dissolved REM content will inherently be less than 1 ppm as the total REM content is only 0.4 ppm.

Regarding claims 8 and 9, Nakato teaches that the prior art methods are insufficient in reducing alumina cluster diameters to below 100 microns, which causes problems with steel sheets for automobiles (column 1, line 55-63). Nakato then mentions that his invention solves this aforementioned problem and one would infer that Nakato therefore creates inclusions/clusters with diameters less than 100 microns. Indeed Nakato claims that *no* alumina clusters are formed.

Regarding the amended features of claims 8 and 9, Ishiguro teaches a steel containing alumina clusters that are minimized by the addition of one or more rare earth metals such as La and Ce (claims 1 and 2).

4. **Claims 4-7** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ishiguro** in view of **Nakato** as applied to claims 1-3 and 8-9 above, in further view of **Nabeshima** (EP 0,906,960 A1).

The disclosures of Ishiguro and Nakato were discussed above, however neither Ishiguro nor Nakato taught the inclusion modification technique to a steel with a composition as reflected in claims 4-7.

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Nabeshima is analogous art in that it is directed to the similar goal of minimizing cluster defects in steels and ensuring that continuous casting nozzles do not clog and accomplishes this by Ti-killing with REM additions (Abstract). Nabeshima goes into detail teaching the concentration of individual elements in the inventive alloy (page 7, lines 31-54)

Nb, B, Mo improve deep drawability and tensile strength [claim 5, 6, and 7]

Ni, Cu, and Cr may be added to improve corrosion resistance [claim 5]

See alloy No. 3 in Table 1 (pages 8 and 9) with concentrations of C, Si, Mn, P, S, Al, and total oxygen (T(O)) in the ranges of claim 4 and Ti in the range of claim 6.

It would have been obvious to one of ordinary skill in the art at the time of the invention, taking the teachings of Ishiguro, Nakato, and Nabeshima as a whole, to modify the process of Ishiguro and Nakato to produce a steel alloy of claims 4-7 as all three references are drawn to the same problem of minimizing inclusions/clusters, and that can, in particular, lead to surface defects that ruin the appearance of sheet metal for use in automobiles (Nabeshima, page 2, lines 24-28; Nakato, column 1, lines 22-28). Furthermore, this is the same problem (page 4, line 30 to page 5, line 5) being addressed by the instant application in reducing alumina clusters (surface slivers in steel sheets used for automobiles is specifically mentioned). One would have a reasonable expectation of success in combining Ishiguro and Nakato with Nabeshima as Ishiguro (claims 1 and 2), Nakato (column 1, lines 5-8), and Nabeshima (Abstract, paragraph 0001) are all successful in reducing or eliminating alumina clusters. One of ordinary skill

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would be motivated to optimize the ranges of the alloying elements disclosed by Nabeshima to produce the alloy of claims 4-7 through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

Regarding the amended features of claims 4-7, all three references are successful in reducing or eliminating alumina clusters (Ishiguro [claims 1 and 2], Nakato [column 1, lines 5-8], and Nabeshima [Abstract, paragraph 0001]).

Response to Applicant's Arguments:

5. Applicant's arguments filed May 2nd, 2008 have been fully considered but they are not persuasive.

Applicants assert (p. 7, para 2) that "the technical features defined in claim 1 of the present invention are not disclosed or suggested by the '578 patent."

In response, all the features of the presently amended claim 1 are addressed by the new 103 rejections necessitated by Applicants' amendments as discussed above. While Nakato (US '578) had required REM and additionally one or more of Ca and Mg, the new reference of Ishiguro, necessitated by Applicants' amendment to redefine the composition of the oxide-based inclusions to consisting essentially of alumina and REM, taught the lone addition of one or more REM such as La and Ce to a de-oxidized steel to minimize alumina clusters while Nakato further taught that the alumina clusters can be further mitigated or even eliminated by adjusting the alumina concentration and implicitly the REM-oxide concentration, in ranges that overlap the instant claims.

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Applicants assert (p. 7, para 5) that the features of claim 2 are not disclosed or suggested by the instant references.

In response, Nakato taught all the importance of the concentration of Ce, a rare earth metal, in decreasing the total oxygen content and all the features of claim 2 are addressed and amount to a prima facie finding of obviousness as reflected in the rejection of claim 2 above.

Applicants assert (p. 8, para 1 and 2) that the example cited from Nakato in support of the rejection of instant claim 3 does not teach or suggest the claimed limitations, in particular the total oxygen concentration.

In response, the total oxygen concentration of example 3, after treatment, is plainly stated as 18 ppm (col. 4, line 65).

Applicants assert (p. 8, para 5) that the subject matter of claims 4-7 "cannot be conceived of from a combination of the teaching of the '578 patent and the '960 patent".

In response, Nabeshima was used as a reference to teach that the applicability of the inclusion composition control method of Ishiguro in view of Nakato to steels such as those of claim 4 and that one would have a reasonable expectation of success in doing so. Nabeshima teaches advantageous steel compositions useful in his inclusion control method, it is not required that Nabeshima be "bodily incorporated" into the inclusion control method of Ishiguro and Nakato. Again, all three references are drawn to the same problem of minimizing inclusions/clusters, and that can, in particular, lead to surface defects that ruin the appearance of sheet metal for use in automobiles (Nabeshima, page

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2, lines 24-28; Nakato, column 1, lines 22-28). Furthermore, this is the same problem (page 4, line 30 to page 5, line 5) being addressed by the instant application in reducing alumina clusters (surface slivers in steel sheets used for automobiles is specifically mentioned). One would have a reasonable expectation of success in combining Ishiguro and Nakato with Nabeshima as Ishiguro (claims 1 and 2), Nakato (column 1, lines 5-8), and Nabeshima (Abstract, paragraph 0001) are all successful in reducing or eliminating alumina clusters.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

-- Claims 1-9 are finally rejected
-- No claims are allowed

The rejections above rely on the references for all the teachings expressed in the texts of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

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All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy M. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Mark L. Shevin/

Examiner, Art Unit 1793

/Roy King/

Supervisory Patent Examiner, Art Unit 1793

August 9th, 2008

10-521,950